National Institute of Standards and Technology

NVLAP®

National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

Revised 9/22/2003

CALIBRATION LABORATORIES **NVLAP LAB CODE 105000-0**

OAK RIDGE METROLOGY CENTER
P.O. Box 2009
Oak Ridge, TN 37831-8091
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NVLAP Code: 20/A01 ANSI/NCSL Z540-1-1994; Part 1 Compliant

DIMENSIONAL

NVLAP Code: 20/D03
Gage Blocks, Steel and Chrome Only

Range	*Best Uncertainty (±)*[note 1]	*Remarks*
0.010 to 0.090	2.5 μin	Mechanical Comparison
0.01 to 1.000	1.9 μin	Mechanical Comparison
2.0 to 4.0	(2 μin + 0.8L) μin[note 3]	Mechanical Comparison

March 31, 2004

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NVLAP Code: 20/D05
Length

Range	*Best Uncertainty (±)*[note 1]	*Remarks*
0 to 1.35 m	(0.3 + 0.4L) μm[note 4]	Step and End Gages using M-60 Coordinate Measuring Machine
0 to 1.2 m	(0.3 + 0.4L) μm[note 4]	Step and End Gages using M-48 Coordinate Measuring Machine

NVLAP Code: 20/D06
Line Standards - Line Scales

Range	*Best Uncertainty (±)*[note 1, 4]	*Remarks*
0 to 800 mm	(0.2 + 0.63L) μm	CMM (optical)

NVLAP Code: 20/D08
Optical Grid Plates/Reference Planes

Range	*Best Uncertainty (±)*[notes 1,4]	*Remarks*
up to 350 mm	(0.6 + 0.15L) μm	CMM (optical), Max Length and Width, (600 x 600) mm
350 to 848 mm	(0.6 + 0.39L) μm	CMM (optical), Max Length and Width, (600 x 600) mm

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Field of view[note 5]	0.2 μm	CMM (optical), Measurements taken within camera field of view

NVLAP Code: 20/D09
Roundness

Range	*Best Uncertainty (±)*[note 1]	*Remarks*
to 6" Diameter and 4" Height	0.1 μm	Roundness Instrument

NVLAP Code: 20/D12
Surface Texture

Range	*Best Uncertainty (±)*[note 1]	*Remarks*
41 μin to 120 μin (1.04 μm to 3.05 μm)	5.51 μin (0.14 μm)	Ra (Roughness Average)
13 μin to 40 μin (0.33 μm to 1.02 μm)	1.92 μin (0.05 μm)	Ra (Roughness Average)
12 μin (0.31 μm)	0.62 μin (0.02 μm)	Ra (Roughness Average)

March 31, 2004

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OAK RIDGE METROLOGY CENTER

NVLAP Code: 20/D15
Two Dimensional Gages

Range	*Best Uncertainty (±)*[note 1]	*Remarks*
0.8 m x 1.2 m	(0.45 + 0.6L) μm[note 4]	M-48 CMM

NVLAP Code: 20/D18
Gears

Range	*Best Uncertainty (±)*[note 1]	*Remarks*
to 6" Diameter	0.9 μm	Involute Profile
to 6" Diameter and Infinite Lead	0.8 μm	Helix
to 6" Diameter and 99" Lead	0.9 μm	Helix
to 6" Diameter and 32" Lead	1.1 μm	Helix
to 6" Diameter and 16" Lead	1.2 μm	Helix
to 6" Diameter and 11" Lead	1.4 μm	Helix
to 6" Diameter (pin offset)	0.7 μm	Pin Master
to 6" Diameter (pin diameter)	0.5 μm	Pin Master
to 6" Diameter (pin roundness)	0.3 μm	Pin Master
to 24" Diameter	1.6 arcseconds	Index and Runout

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TIME AND FREQUENCY

NVLAP Code: 20/F01
Frequency Dissemination

Range	*Best Uncertainty (±)in Hz*[note 1]	*Remarks*
1 MHz, 5 MHz, 10 MHz	1.01×10^{-10}	Comparison using FMS
1 MHz, 5 MHz, 10 MHz	5.3×10^{-10}	Comparison
1 Hz to < 1 MHz	$(1 \times 10^{-6} + 0.1$ Hz)[note 2]	Direct Reading
1 MHz to 10 MHz	1×10^{-8}[note 2]	Direct Reading
>10 MHz to 1 GHz	1×10^{-7}[note 2]	Direct Reading

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OAK RIDGE METROLOGY CENTER

MECHANICAL

NVLAP Code: 20/M08
Mass

Range	*Best Uncertainty (±)in mg*[note 1]	*Remarks*
30 kg	28	Echelon II
25 kg	26	Echelon II
20 kg	25	Echelon II
10 kg	12	Echelon II
5 kg	7	Echelon II
3 kg	6	Echelon II
2 kg	6	Echelon II
1 kg	1.183	Echelon II
500 g	0.593	Echelon II
300 g	0.254	Echelon II
200 g	0.238	Echelon II
100 g	0.088	Echelon II
50 g	0.058	Echelon II
30 g	0.076	Echelon II

March 31, 2004

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20 g	0.030	Echelon II
10 g	0.046	Echelon II
5 g	0.0058	Echelon II
3 g	0.0052	Echelon II
2 g	0.0064	Echelon II
1 g	0.0085	Echelon II
500 mg	0.0031	Echelon II
300 mg	0.0057	Echelon II
200 mg	0.0034	Echelon II
100 mg	0.016	Echelon II
50 mg	0.0009	Echelon II
30 mg	0.034	Echelon II
20 mg	0.02	Echelon II
10 mg	0.089	Echelon II
5 mg	0.013	Echelon II
3 mg	0.027	Echelon II
2 mg	0.015	Echelon II

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1 mg	0.02	Echelon II

THERMODYNAMIC

NVLAP Code: 20/T05
Pressure

Range	*Best Uncertainty (±) ppm*[note 1]	*Remarks*
Pneumatic Deadweight Piston Gauge (absolute Mode) - Direct Pressure Comparison		
1.2 to 23.6 psia [8.3 to 162.7 Kpa]	500	
5.7 to 95.6 psia [39.3 to 659.1 Kpa]	101	
41.9 to 1001.6 psia [288.9 to 6905.8 Kpa]	45	
Pneumatic Deadweight Poston Gauge (Gauge Mode) - Direct Pressure Comparison		
1.2 to 23.6 psia [8.3 to 162.7 Kpa]	26	Nitrogen
5.7 to 95.6 psia [39.3 to 659.1 Kpa]	22	Nitrogen
41.9 tp 1001.6 psia [288.9 to 6905.8 Kpa]	43	Nitrogen
Hydraulic Deadweight Piston Gauge (Gauge Mode) - Direct Comparison		
203 to 3771 psig [1.4 to 26 Mpa]	60	Oil

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OAK RIDGE METROLOGY CENTER

2031 to to 19,870 psig [14 to 137 Mpa]	70	Oil
4061 to 39,595 psig [28 to 273 Mpa]	70	Oil

NVLAP Code: 20/T07
Resistance Temperature Devices

Range	*Best Uncertainty (±)*[note 1]	*Remarks*
0.01 °C to 29.7646 °C	0.001 °C	Comparison

1. Represents an expanded uncertainty using a coverage factor, k=2
2. Realizable uncertainty depends on frequency being measured, customer requirements, and suitability of customer's equipment.
3. L is length in inches.
4. L is length in meters.
5. Glass Reticles, Stage Micrometers, Glass Magnification Scales, Orthogonality Standards, and Calibration Charts.

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